Claims

1. A method for treating or preventing allergy or asthma, comprising administering to a subject a poly-G nucleic acid in an effective amount for treating or preventing allergy or asthma.

2. The method of claim 1, wherein the poly-G nucleic acid comprises the following formula:

5' $X_1X_2GGGX_3X_4$ 3'

wherein X_1, X_2, X_3, and X_4 are nucleotides.

3. The method of claim 2, wherein at least one of X_3 and X_4 are a G.

4. The method of claim 2, wherein both of X_3 and X_4 are a G.

5. The method of claim 1, wherein the poly-G nucleic acid comprises the following formula:

5' GGGNGGG 3'

wherein N represents between 0 and 20 nucleotides.

6. The method of claim 1, wherein the poly-G nucleic acid comprises the following formula:

5' GGGNGGGNGGG 3'

wherein N represents between 0 and 20 nucleotides.

7. The method of claim 1, wherein the poly-G nucleic acid is free of unmethylated CG dinucleotides

8. The method of claim 7, wherein the poly-G nucleic acid is selected from the group consisting of SEQ ID NO 95-133.

9. The method of claim 1, wherein the poly-G nucleic acid includes at least one unmethylated CG dinucleotide.

10. The method of claim 9, wherein the poly-G nucleic acid is selected from the group consisting of SEQ ID NO: 46, SEQ ID NO: 47, SEQ ID NO: 58, and SEQ ID NO: 61.

11. A composition comprising a poly-G nucleic acid in an aerosol formulation.

12. A method for treating or preventing asthma or allergy in a hypo-responsive subject, comprising:

administering to a hypo-responsive subject having asthma or allergy or at risk of developing asthma or allergy an immunostimulatory nucleic acid in an effective amount for treating or preventing asthma or allergy.

13. The method of claim 12, wherein the hypo-responsive subject is hypo-responsive to an asthma/allergy medicament.

14. The method of claim 12, wherein the hypo-responsive subject is selected from the group consisting of a subject who is refractory to an asthma/allergy medicament, a subject who is a non-responder to an asthma/allergy medicament, an elderly subject and a neonatal subject.

15. The method of claim 12, wherein the immunostimulatory nucleic acid has a modified backbone.

16. The method of claim 15, wherein the modified backbone is a phosphate modified backbone.

17. The method of claim 16, wherein the phosphate modified backbone is a phosphorothioate modified backbone.

18. The method of claim 12, wherein the immunostimulatory nucleic acid is a CpG nucleic acid.

19. The method of claim 18, wherein the immunostimulatory nucleic acid is a T-rich nucleic acid.

20. The method of claim 18, wherein the immunostimulatory nucleic acid is a poly-G nucleic acid.

21. The method of claim 12, further comprising administering to the hypo-responsive subject an asthma/allergy medicament.

22. The method of claim 21, wherein the asthma/allergy medicament is administered in a sub-therapeutic amount.

23. The method of claim 21, wherein the asthma/allergy medicament is an asthma medicament.

24. The method of claim 21, wherein the asthma/allergy medicament is an allergy medicament.

25. The method of claim 21, wherein the asthma/allergy medicament is selected from the group consisting of a steroid and an immunomodulator.

26. The method of claim 25, wherein the steroid is selected from the group consisting of beclomethasone, fluticasone, tramcinolone, budesonide, and budesonide.

27. The method of claim 25, wherein the immunomodulator is selected from the group consisting of an anti-inflammatory agent, a leukotriene antagonist, an IL-4 mutein, a soluble IL-4 receptor, an immunosuppressant, anti-IL-4 antibody, an IL-4 antagonist, an anti-IL-5 antibody, a soluble IL-13 receptor-Fc fusion protein, an anti-IL-9 antibody, a CCR3 antagonist, a CCR5 antagonist, a VLA-4 inhibitor, and a downregulator of IgE.

28. The method of claim 27, wherein the downregulator of IgE is an anti-Ig antibody or a fragment thereof.

29. The method of claim 27, wherein the immunosuppressant is a tolerizing peptide vaccine.

30. The method of claim 21, wherein the asthma/allergy medicament is a medicament selected from the group consisting of a PDE-4 inhibitor, a bronchodilator/beta-2 agonist, a K+ channel opener, a VLA-4 antagonist, a neurokin antagonist, a TXA2 synthesis inhibitor, Xanthanine, an arachidonic acid antagonist, a 5 lipoxygenase inhibitor, a thromboxin A2 receptor antagonist, a thromboxane A2 antagonist, an inhibitor of 5-lipox activation protein, and a protease inhibitor.

31. The method of claim 30, wherein the bronchodilator/beta-2 agonist is selected from the group consisting of salmeterol, salbutamol, terbutaline, D2522/formoterol, fenoterol and orciprenaline.

32. The method of claim 21, wherein the asthma/allergy medicament is a medicament selected from the group consisting of an anti-histamine and a prostaglandin inducer.

33. The method of claim 32, wherein the anti-histamine is selected from the group consisting of loratidine, cetirizine, buclizine, ceterizine analogues, fexofenadine, terfenadine, desloratadine, norastemizole, epinastine, ebastine, ebastine, astemizole, levocabastine, azelastine, tranilast, terfenadine, mizolastine, betatastine, CS 560 and HSR 609.

34. The method of claim 32, wherein the prostaglandin inducer is S-5751.

35. The method of claim 21, wherein the immunostimulatory nucleic acid is administered concurrently with the asthma/allergy medicament.

36. A method for preventing asthma or allergy in a subject at risk of developing asthma or allergy, comprising:

administering to a subject at risk of developing asthma or allergy an effective amount of an immunostimulatory nucleic acid substantially prior to an asthmatic or an allergic event.